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Preliminary study on polysulfone (PSF) membranes employed in separation processes for wastewaters purification application

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In the sustainable global development context, the increasing demand of water for human requirements favored the research on alternative wastewaters purification processes. In the last 50 years, new technologies for substances separation, so-called *membrane processes* (Microfiltration, Nanofiltration, Ultrafiltration, Osmosis), have been extensively studied. They use different membranes and operative conditions promoting the separation and removing contaminant particles in a wide molecular cut-off range. Ultrafiltration process, used for water treatment, works in low-pressure conditions. One of the most used polymers is Polysulphone (PSF) due to its high thermal, chemical and hydrolytic stability. In the present work, a preliminary investigation on PSF membranes with hydrophilic and antifouling properties is presented. The phase inversion method by *non-solvent coagulation-bath-technique* was used to obtain asymmetric membranes with different characteristics of porosity, hydrophilic properties, macro-voids size and shape. The following parameters were considered: not-solvent kind, de-mixing time, polymer concentration, surfactant insertion/concentration. The membranes were characterized in terms of XRD, TGA-DSC, dimensional analysis, water retention, qualitative contact-angle, DMA. In particular, cross-section SEM was used to evaluate the relationship between membrane formation and obtained morphology, pursuing the *finger-like macro-voids* morphology, suitable for final application. Promising results in terms of compromise morphology/hydrophilic properties/stiffness were obtained and some of these samples permitted having a good approximation for finger-like morphology, aspect to further investigate. Permeability tests, contact angle and zeta potential measurements are actually in progress in order to individuate the most suitable procedure and the most performing sample for application in the industrial wastewaters purification and recovery of contaminating species.

Biography

Ada Saccà is a chemist. She completed his PhD in *Materials for the environment and energy* from TorVergata University (Rome, Italy) in 2006, 2nd level Master's degree in *Hydrogen production systems and means of transport with fuel cells* from Messina University (Italy) in 2008. She is actually researcher and has a permanent position at National Research Council of Italy, Institute for Advanced Energy Technologies *Nicola Giordano* (Messina, Italy). Her activity regards Components for PEFC, Fillers for PEM and Electrodes, Membranes for Electrochemical Devices and, recently, for Separation Processes. She published 32 papers on international journals, 73 on abstracts books, 53 reports.

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